By this mode, two patterns will anſwer for the whole of the trough-plates, and but few will be required for the ſprings, rails, and ſpurs; while the ſaving in time and expence will be conſiderable; particularly where it is neceſſary to bring the ſtone by long land-carriage; for the arches being diſpenſed with, and the piers not more than one-third the dimenſions neceſſary to an aqueduct of ſtone, will moſt materially reduce the quantity of maſonry.

But, according to the various circumſtances of ſituation, carriage of ſtone, iron, &c. the diſparity between the two modes will be eaſily determined, added to which, the durability may be of ſome importance.

In aqueducts of ſtone, one of the great difficulties is to line and puddle ſo tight, as to prevent the water penetrating into, and injuring the maſonry; but in one of iron, ſhould a leak take place, it will inſtantly appear; and on ſhutting the ſtop-gates at each end, and diſcharging the water, it may be ſtopped in a few *hours, if not minutes:* this circumſtance, in aqueducts, is, perhaps, one of the greateſt preſervatives; they are conſequently leſs liable to injury, and only ſubject to the corroding tooth of time.

CHAP.

CHAP. XXI.

ON BRIDGES.

THOUGHTS on aqueducts, and their conſtruction of iron, bear ſo near a relation to bridges, that the ideas naturally tend to that ſubject, and hence I am led to offer ſome drawings on their formation of iron and wood.

In this country the attention of engineers, of late years, have been much engaged in bridges of iron, which bridges are progreſſively expanding as experience produces courage; nor ſhould I be ſurpriſed, if genius in time gave the mechanic rainbow of one thouſand feet to wide and rapid rivers.

In ſuch countries as Ruſſia and America, an extenſive arch ſeems to be a conſideration of the firſt importance: in croſſing their rivers, as the rivers, or even rivulets, in time of rain ſuddenly ſwell to a great height, and in the Spring, on breaking up of the ice, the immenſe quantities which is borne down with a rapid ſtream would, if interrupted by ſmall arches and piers, collect to ſuch a weight as ultimately to bear away the whole; it is therefore neceſſary that one arch ſhould be extended as far as poſſible, in ſuch ſituations, and ſo high as to ſuffer every thing to paſs through; or the inhabitants muſt, without ſome other expedient, ſubmit their paſſage to the caſualties of the weather.

The moſt extenſive ſpan of wooden bridges, as far as I am acquainted with the ſubject, are thoſe of Schaffhauſen and Wettingen, in